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(19) **United States**(12) **Patent Application Publication**
Rosenberg et al.(10) **Pub. No.: US 2004/0075676 A1**(43) **Pub. Date: Apr. 22, 2004**(54) **HAPTIC FEEDBACK FOR TOUCHPADS AND
OTHER TOUCH CONTROLS**(76) Inventors: **Louis B. Rosenberg**, San Jose, CA
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COOLEY GODWARD LLP**ATTN: PATENT GROUP****11951 FREEDOM DRIVE, SUITE 1700****ONE FREEDOM SQUARE- RESTON TOWN
CENTER****RESTON, VA 20190-5061 (US)**(21) Appl. No.: **10/615,986**(22) Filed: **Jul. 10, 2003****Related U.S. Application Data**(63) Continuation of application No. 10/213,940, filed on
Aug. 6, 2002, which is a continuation of application
No. 09/487,737, filed on Jan. 19, 2000, now Pat. No.
6,429,846, which is a continuation-in-part of appli-
cation No. 09/467,309, filed on Dec. 17, 1999, now
Pat. No. 6,563,487, which is a continuation-in-part of
application No. 09/156,802, filed on Sep. 17, 1998,now Pat. No. 6,184,868, and which is a continuation-
in-part of application No. 09/103,281, filed on Jun.
23, 1998, now Pat. No. 6,088,019, and which is a
continuation-in-part of application No. 09/253,132,
filed on Feb. 18, 1999, now Pat. No. 6,243,078.**Publication Classification**(51) **Int. Cl.⁷ G09G 5/00**(52) **U.S. Cl. 345/701**(57) **ABSTRACT**

A haptic feedback planar touch control used to provide input to a computer. A touch input device includes a planar touch surface that inputs a position signal to a processor of the computer based on a location of user contact on the touch surface. The computer can position a cursor in a displayed graphical environment based at least in part on the position signal, or perform a different function. At least one actuator is also coupled to the touch input device and outputs a force to provide a haptic sensation to the user contacting the touch surface. The touch input device can be a touchpad separate from the computer's display screen, or can be a touch screen. Output haptic sensations on the touch input device can include pulses, vibrations, and spatial textures. The touch input device can include multiple different regions to control different computer functions.

